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## Method and Device Utilizing Polymorphic Data in E-Commerce

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### Background of the Invention

#### Field of the Invention

15

The present invention relates to use of polymorphic data in a session between a buyer and seller, or any pair of trading partners, mediated by a broker or e-commerce hub. In particular, methods and devices utilizing a flexible service request and session end messages are described.

20

#### Description of Related Art

A desire for electronic commerce brings trading partners together. Broker or hub applications can facilitate transactions between trading partners in many ways. The broker application can field an initial session start request from the buyer and forward it to a seller, either acknowledging the start of the session explicitly or leaving it to the seller to acknowledge the start of the session to the buyer. This and other variations on the manner in which electronic commerce is implemented have implications for software design.

25

### Summary of Invention

An aspect of the present invention includes a protocol for conveying data during an e-commerce session with a polymorphic response, comprising initiating a session with a first message from a buyer application to a broker application and a second message from the broker application to a supplier application; conducting the session between the buyer

30

application and the supplier application; and responding during the session with an additional message which includes a schema identifier for the additional message, resolvable in a context of a system identifier and a polymorphic response comprising a type and a version, wherein the polymorphic response includes additional data elements corresponding to values assigned to the type and version. Additional aspects of the invention can be found in the  
5 detailed description, the figures and the claims.

### **Brief Description of Figures**

Figure 1 is a schematic diagram of components useful between buyer and supplier.

10 Figure 2 is a schematic diagram of processes from subscription through purchase order.

Figures 3-6 are schematic diagrams extracted from or resembling figure 3, with reduced detail to aid in understanding various processes.

Figure 7 is an interaction diagram from beginning with a user's initiation of a session.

15

### **Detailed Description**

The following description of various aspects and embodiments of the invention is presented for purposes of illustration and description. The description is not intended to limit the invention to the precise forms disclosed. Many modifications and equivalent  
20 arrangements will be apparent to people skilled in the art.

One embodiment practicing aspects of the present invention is so-called RoundTrip(TM) software. RoundTrip facilitates connections between buyers and suppliers for connecting via a MarketSite(TM) portal. Other embodiments of the present invention will be adapted to facilitating connections between trading partners using other e-commerce  
25 portals and connections, including OBI compliant protocols. RoundTrip software may be delivered as a patch to the XML commerce connector (XCC) software or as a stand alone package. Buyers use the XCC software or equivalent components of a stand alone package to process polymorphic messages involving the RoundTrip software. Suppliers optionally may use the XCC software. Custom adaptations to the RoundTrip software by suppliers are  
30 supported. The RoundTrip software facilitates return of shopping cart data from a supplier application to a buyer application, after the buyer has created the shopping cart at the supplier site. The buyer application can then use the shopping cart data to create a purchase order which it can send to the supplier application without involvement of the RoundTrip software.

One aspect of the present invention, found in the RoundTrip software, is use of a polymorphic message in the context of an e-commerce session to respond with results during a session, sometimes at or near the end of the session. A polymorphic message, described further below, is capable by design of returning shopping cart data, product configuration data, tax calculation data, foreign freight forwarding data, status inquiry responses or another form of data which reflects the interaction between the buyer and supplier. Another aspect of the present invention is use of a polymorphic message to initiate a session, the polymorphic message being adaptable to sending out purchase orders, purchase order responses, invoices, advance shipping notices or the like.

10 In presenting the RoundTrip software embodiment, reference is made to buyers and suppliers. Buyers and suppliers might alternatively be referred to as trading partners. Reference to buyers or buyer applications is to be taken in its broadest sense as referring to a party or application which seeks goods, services, commercial data or the like. Reference to suppliers or supplier applications has a similarly broad meaning, referring to the source of goods, services or data which the buyer seeks out. The RoundTrip software itself is referred to as the broker application. This software and equivalent applications may sometimes be called e-commerce hubs.

Figure 1 illustrates software components which interact with the RoundTrip software. A firewall 101 surrounds these components. The RoundTrip software may be installed as a patch to the XCC software, both represented by 112. Other software components include an L1 router 113, an L2 registration 114, and an L2 integrated supplier 116 with a forwarding service 117. In practicing the present invention, these components of Commerce One's implementation of the present invention are generally interchangeable with components of alternative e-commerce systems. Fewer more components can be adapted to practicing aspects of the present invention. Software components may be deployed on one or more of servers in communication with each other via a secure (encrypted or physically secure) or insecure connection. The L1 router 113 routes messages through the portal. It is useful for this router to be maintained in a DMZ, allowing it to act as a receiving point for all external documents and to make HTTP/S connections with suppliers. To route messages, the L1 router maintains a database of destinations to which it posts messages. These destinations can be URL addresses. The L2 registration component 114 handles and maintains registration of buyers. The L2 integrated supplier 116 provides the service of forwarding message to trading partners. In this case, it forwards the shopping cart received by the broker

application, of which it could be considered a part, to the buyer application. The XCC software operates at the MarketSite Messaging Layer (MML). Buyer application messages to the RoundTrip software are compliant with published MML layer protocols. The RoundTrip software can run on the NT operating system platform. It is designed to use MS SQL Server, Apache web server and JRun. Other embodiments the present invention may be adapted to other operating systems, databases, servers and software interpreters or compilers. The RoundTrip software may be positioned on the opposite side of a firewall from the buyer application, or on the same side.

Figure 2 is the high-level data flow for the RoundTrip software. Figure 3-6 are excerpts or variations of this figure which illustrate various aspects of data flow. A RoundTrip user navigates through a sequence of links to arrive at the desired supplier's first page. One navigation flow is from a buyer view, to a RoundTrip home page, to a service or supplier selection page, to a supplier first page. An alternative navigation flow would begin from within a catalog, proceeding from a level corresponding to the supplier, product or commodity of interest. The buyer would be routed from the catalog maintained for the buyer to a supplier site. The session during which the buyer is in contact with the supplier may be referred to as a supplier service session or simply a session. The start and end of the session are handled by the RoundTrip software. The interaction between the buyer and supplier may occur directly between the user's web browser and the trading partner's web based service, or may be relayed through the broker.

The following interaction overview can be understood with reference to figure 2. The supplier 240 registers with the RoundTrip software 210. This registration to be handled manually, through a registration agent, or online. Online registration may be subject to manual or off-line verification. On the buyer side, the buyer 230 subscribes to one or more RoundTrip 210 enabled services. This can be either a manual procedure or an automated selection. An automated selection is facilitated by use of compatible software by buyer and supplier. Subscription services need to be accompanied by customizations or translators when the supplier side software is not natively compatible with the buyer side software. A broker session starts when a user of the buyer application 230 initiates a session. This may include selecting the RoundTrip home page 210. Interaction during a broker session allows the buyer to view available services and select a specific service. In alternative embodiments, such as for tax calculation, a "buyer" application could automatically invoke the desired service through the broker application, without any explicit act of user selection. When the

buyer 230 selects the service, a supplier service session start document flows from the broker application 210 to the supplier application 240. This document may contain both data provided by the buyer during the session and data preregistered by the buyer in a registration database. This document can be transmitted by an HTTP/S Post, to a supplier provided URL with an XML format document in a hidden field. The supplier provided URL corresponds to location with a supplier has a script running that takes the session start document and stores it a database. The supplier application then does an HTTP redirect to an additional supplier URL that is to be seen by the buyer application. Alternatively, the broker application can provide the redirect data to the buyer application, for the buyer application to execute the redirect. The location at which the session start document is stored is forwarded as a parameter with the redirect message. This may result in a top-level page of the supplier service being displayed on the buyer's browser. In one embodiment of the present invention, the supplier application at the initial URL discards any cookies received before executing the redirect with reference to the location where the session start document is stored, to the additional supplier URL. Use of an HTTP redirect is useful to facilitate proper resolution of relative links to the supplier URL by the buyer's browser and to facilitate proper handling of cookies issued by the supplier URL to a buyer browser. The buyer and supplier may proceed to interact directly 250. Alternatively, their interactions can be routed through the broker. Upon completion of the session, the buyer ends the interaction with the supplier application, for instance by clicking an accept or cancel button. In one embodiment, this results in a shopping cart commitment or in a cancellation. The supplier application 240 sends a supplier service session end document to the the broker 210. When the interaction produces a shopping cart, the shopping cart data or are reference thereto is included in the message. The broker application 210 next transmits the session details (e.g., shopping cart) to the buyer application 230. In one embodiment, the broker application does an HTTP post of the message to an appropriate buyer application URL, e.g., for a procurement application. In this embodiment, the RoundTrip software waits for an HTTP Reply from the buyer application. The buyer application 230 may use the order information to create or update a requisition or purchase order 231. Without need for interaction through the broker application, the buyer application may transmit this purchase order through MarketSite software 220 or directly to a supplier 240. Special messages can be used in cases of session cancellation, errors during the session between buyer and supplier, or a recoverable timeout. In the general data flow of figure 2, implicit login may be supported, whereby the broker stores the password for the

buyer's organization to be sent to the supplier and uses it upon authentication of the buyer. The buyer application may be configured to send a broker both the buyer's userids and passwords for gaining access to the RoundTrip software and to the supplier site.

Alternatively the broker application can maintain a table of userids and passwords for  
5 suppliers corresponding to userids and password's provided by the buyer application. At the IP session level, it is useful for communications among the buyer, broker and supplier applications to use a secure socket layer (SSL) protocol so that the data is securely exchanged.

Figure 3 focuses on registration of the supplier 240, buyer 230 and their  
10 applications. In one embodiment, both the buyer and supplier receive valid market participant IDs (MPIDs) from a MarketSite administrator. In overview, the supplier registers the set of services it will provide, compatible with the RoundTrip software. For each service the supplier provides a URL that points to the service, a URN, and the type of the service. The details of the supplier's service registration are described below. The buyer subscribes to  
15 one or more services that are RoundTrip enabled. The buyer provides URLs for receiving session and messages can the error messages. When the buyer is using XCC, this URL may be the same as the XCC URL. The buyer provides their supplier assigned account number and their organization MPID. The MPID may identify the buyer with any level particularly, such as company, department or individual buyer. Localization information also may be  
20 provided, such as the language, country and currency for transactions. Upon registration, the buyer receives a URL to which buyer application can send a broker session start request. The details of the buyer's service subscription are described below. Note that a contractual relationship between the buyer and supplier may be the basis for receiving a supplier assigned account number and corresponding password. A trading partner may fulfill both the rules of  
25 buyer and supplier in different sessions.

The table below provides further information regarding supplier service registration, according to the RoundTrip software embodiment. The information set forth in the table enables buyer side applications to connect to and interact with a supplier's RoundTrip enabled services. The information described in the table may be provided either via a paper  
30 registration form or an online registration form verified a MarketSite operator.



Item	Description
DocumentExchange ProtocolInformation	Specifies the document exchange protocol and version expected by the supplier application, e.g., "RoundTrip" version 1.0.
DocumentExchange FormatInformation	Specifies data format expected by the supplier application in the "Supplier Service Session Start" and "Supplier Service Session End" data messages, e.g., CBL version 2.0.
DocumentExchange Timeout	Specifies the service timeout value in minutes.
DocumentExchange SecurityInformation	Will indicate the authentication scheme imposed by the trading partner's service. Options would be implicit or explicit sign-on.
ServiceURN	Used as a key to lookup further RoundTrip registry information. This is a supplier service specific URN, e.g., "catalog:supplier-name". Assigned by the MarketSite operator in agreement with the supplier/trading partner.
ServiceURL	The specific location (URL) of the service. Provided by supplier/trading partner. Examples: http://www.supplier.com/catalog.asp or http://www.supplier.com/cgi-bin/catalog.cgi/roundtrip or http://www.supplier.com/cgi-bin/catalog.cgi?FLAVOR=ROUNDTRIP.
ServiceSessionTime out	Specifies service's user session timeout value in minutes.
TradingPartnerId	Identifies the trading partner that is registering the service. This would typically be the MPId (MarketPlace Id) of the supplier.
ServiceId	The service id unique to a supplier.
ServiceType	Specifies the type of service that is being run.
ServiceName	Service name.
AppFieldMap	Reserved for future use.
AppServiceData	Reserved for future use.

The next table below provides further information regarding initial buyer registration, according to the RoundTrip software embodiment. The information described in the table may be provided either via a paper registration form or an online registration form verified a

5 MarketSite operator. Default values, subject to overrides, can be assigned to many of these items, including localization values, the Document Exchange Protocol Information, the Accept and Cancel URLs and Labels

Variable	Description
OrgID	Buyer organization or BuySite identifier
BuyerAppName	Buyer application name/id.
BuyerAppVersion	Buyer application version.
BuyerAppFrameSize	Buyer application's frame size
DocumentExchangeProtocolInformation	Specifies the document exchange protocol and version used. For the initial release, the protocol is "RoundTrip" and the version is 1.0.

Variable	Description
SessionTimeout	Client session timeout value in minutes.
Language	The user preferred two-letter ISO language code. Reference CBL element LangCode.
Currency	Reference CBL element CurrencyCode.
Country	Can be used to determine/guess the number and date formats. Reference CBL element CountryCode.
AcceptURL	A URL to a buyer side ASP/servlet/CGI for uploading the configured order.
AcceptLabel	This is the button label that the trading partner web-based services will associate with the Callback URL. Optional.
CancelURL	A URL to a buyer side ASP/servlet/CGI for handling the user canceling the configurator process.
CancelLabel	This is the button label that the suppliers will associate with the Cancel URL.

After initial registration, the buyer will specify the supplier and supplier services that it wants to subscribe/unsubscribe to. The following information can be used to identify supplier

5 services to which the buyer is subscribing.:

Variable	Description
OrgID	Buyer organization or BuySite identifier
SupplierID	Identifies the supplier that provides the service being registered to. This would typically be the MPID (MarketPlace Id) of the supplier.
SupplierServiceID	The service id unique to this supplier.

For each service, the buyer will also register and service specific data. Some examples of these data items are:

SupplierAssignedAccountNum	For the supplier-based services, this is the customer number assigned by the supplier to the buying organization. This facilitates contract pricing.
DistributorAssignedAccountNum	For distributor-based services, this is the customer number assigned by the distributor to the buying organization. This also facilitates contract pricing.

Figure 7 and 4 generally illustrate the processes leading to issuance of the broker session start document. In figure 7, interactions take place among the user 701, the user's web browser 702, a buyer application or BuySite 703, a broker application 704 and the supplier application 705. The user navigates to a requisitioning screen with reference to RoundTrip software and performs some action 710. The user's action at the requisitioning screen causes

an HTTP Post message 711 to be sent to the broker application for a broker session start. A schema for such a message is set forth below. The broker application verifies the user privileges 712 and takes other steps described in more detail below. The broker application issues an HTTP reply 713 to the user's web browser 702.

5        Figure 4 provides additional detail regarding the broker application's processes in response to the buyer's BrokerSessionStart document. The buyer 230 sends a BrokerSessionStart document to the broker 210. An HTTP/S Get or Post connection can be used. The buyer's document contains the buyer MPID and the buying organization's user ID and password. The broker 210 validates the buyer by publishing a ping document to L1 413,  
 10        using the buyer MPID and buying organization's user ID and password. The L1 component forwards the ping document to L2 414 and its ping service 415. The response is a pong message which validates the buyer. In an alternative embodiment, the SiteMinder™ product by Netegrity™ can be used to validate the buyer. Information regarding this product is available through <http://www.netegrity.com/products/siteminder.html>. Once the buyer is  
 15        validated, the broker returns the list of services to which the buyer has subscribed. When the buyer selects one of the returned services, another HTTP/S Get or Post request from the browser, to the procurement application, through the broker is generated. In this embodiment, the buyer sends the broker a document containing the Supplier-assigned userid and password, and SessionID and SessionContext for the buyer session start.. The broker  
 20        receives this request at the start document URL. The broker then constructs a Supplier Service Session Start XML document, and sends it on as an HTTP/S Post to the supplier.

A Sox schema for RoundTrip BrokerSessionStart message appears below. Those familiar with the art will recognize Sox as an extension to XML proposed as an open specification through W3C at [HTTP://www.w3.org/TR/NOTE-SOX](http://www.w3.org/TR/NOTE-SOX). The full Sox  
 25        specification, version 2, has been published at <http://www.commerceone.com/xml/sox/download/index.html>. The schema below is self documenting. Some comments and explanations of data usage follow the schema.

```

30        <?xml version="1.0"?>
       <!DOCTYPE schema SYSTEM
       "urn:xcommerceone:document:com:commerceone:xdk:xml:schema.dtd$1.0">
       <schema uri="urn:x-commerceone:document:com:commerceone:
       roundtrip:schemas:RoundTripBrokerSessionStart.sox$1.0">

```

```
<namespace prefix="cbl" namespace="urn:x-
commerceone:document:com:commerceone:CBL:CBL.sox$1.0">
```

```
<comment>
```

```
Copyright 1999 Commerce One Inc.
```

```
</comment>
```

```
<elementtype name="BrokerSessionStart">
```

```
<model>
```

```
<sequence>
```

```
<element type="LoginInfo"/>
```

```
<element type="SessionInfo"/>
```

```
<element type="PassThruData" occurs="?" />
```

```
</sequence>
```

```
</model>
```

```
</elementtype>
```

```
<elementtype name="SessionInfo">
```

```
<model>
```

```
<element type="SessionContext" occurs="?" />
```

```
</model>
```

```
<attdef name="SessionID" datatype="string"><required/>
```

```
<explain>
```

```
<p>This is the user session id assigned by the buyer-side
application.</p>
```

```
</explain>
```

```
</attdef>
```

```
</elementtype>
```

```
<elementtype name="SessionContext">
```

```
<model>
```

```
<element type="string" name="OrgId" occurs="?" /> // e.g. the BuySite
internal Buying Organization id.
```

```
<element type="string" name="ParentOrgId" occurs="?" /> <!-- e.g.
the BuySite internal Enterprise (EBO) Id. -->
```

```
<element type="string" name="OrderId" occurs="?" /> <!-- Id of user's
current requisition. -->
```

```
</model>
```

```
</elementtype>
```

```
<elementtype name="LoginInfo">
```

```

    <explain>
      <p>The <code>LoginInfo</code> contains the
      authentication data for signing onto the RoundTrip
      services.</p>
5      <p>It is intended that this element be extended to
      support other authentication schemes such as single
      sign-on.</p>
    </explain>
  <model>
10    <sequence>
      <element type="Organization"/>
    </sequence>
  </model>
  </elementtype>
15
<elementtype name="Organization">
  <attdef datatype="string" name="ID"><required/>
    <explain>
      <p>The <code>Organization</code> may be identified by a
20      <code>ID</code> that is known to some
      <code>Agency</code>. The <code>Agency</code> should be
      identified with an <code>AgencyID</code> (or an
      <code>AgencyOther</code>).</p>
    </explain>
25    </attdef>
    <attdef name="AgencyID" prefix="cbl"
    datatype="AgencyCode"><required/>
      <!-- <explain>
        <p>An <code>Agency</code> chosen from a list of standard
30        <code>Agencies</code>. This identifies the
        <code>Agency</code> that issued the <code>PartyID</code>.
        For MarketSites, use Other unless the specific MarketSite
        has an AgencyCode.</p>
      </explain> -->
35    </attdef>
    <attdef datatype="string" name="AgencyOther">
      <explain>
        <p>If the <code>AgencyID</code> is <code>Other</code>
40        the <code>Agency</code> identifier may be specified
        as a string. If the Agency is a MarketSite, use the
        MarketSite short name or MarketSite Participant ID.</p>

```

```

    </explain>
  </attdef>
</elementtype>

```

```

5  <elementtype name="PassThruData">
    <explain>
      <p>A place holder element for any other data that is
        required by the application to process the document(s) and
        other information returned in the BrokerSessionEnd.</p>
10  <p><code>Content</code> - Format to be defined by the
        application. Note it cannot be in XML format (XML data can
        be URL encoded or otherwise encoded).</p>
    </explain>
    <model>
15  <element name="Content" type="string" occurs="?" />
    </model>
  </elementtype>
</schema>

```

20 This schema works in conjunction with XML Common Business Language (xCBL) documents published as an open standard at the Commerce One download site referenced above. In other embodiments of the present invention, EBXML documents (Sun sponsored) or other schemas could be used for starting the broker session. The table below explains some data usage corresponding to the schema above.

25

Variable	Description
SessionID	Identifies the user session.
SessionContext	Session context. For example, this may include the user's requisition id and buyer organization Id.
UserID	The user id and password field will be activated when single sign-on is enabled.
Password	
OrgID	This will be the organization's MarketSite Participant ID (MPID) when the OrgIDAgency is set to a MarketSite. Alternatively, this could be an identifier assigned by another agency such as EAN.
OrgIDAgency	This will be the identifier for the agency that assigned the OrgID. For example, MarketSite.net or EAN.
PassThruData	A self-describing data structure that is passed through by the service broker. This can be used by

Variable	Description
	the buyer and supplier applications to exchange service specific data without needing a protocol change.

Figure 7 provides an additional view of this interaction. In practice of the RoundTrip embodiment, the broker 703, at the service list selection URL receives the buyer's request for a list of available services 721. Upon receiving this request, the broker consults its database to determine the set of services to which the buyer with the given OrgID is subscribed 722. It saves the user session context for later use 723. It returns this list of services to the buyer's browser, as an HTTP/S Reply 724. The buyer selects a service from the list of services 730. This causes the browser to send an HTTP/Get or Post request 730 to the procurement application, which in turn does an HTTP/S Post 731 to the RoundTrip broker, to send to it, over an HTTP/S connection, the service selected, along with the supplier assigned userid/password. The broker looks up the URL of the selected service 732, gathers context data for use in the supplier session 733 and creates data structures to support the supplier session 734. In particular, in the RoundTrip embodiment, the broker creates the Service Session Start request document 734, and forwards it 735 over an HTTP/S connection, to the supplier 705. The supplier caches the data, performs a redirect, and then sends an HTTP/S Reply to the broker 737, who forwards the reply 738 on to the buyer 702. The broker 703 can log the session 739.

Figures 7 and 5 portray processes including supplier service selection and supplier service session start. The buyer 230 transmits the service selection to the broker application or e-commerce hub 210. The broker processes the selection and generates a supplier service session start document which it transmits to the supplier 240.

When the user selects a specific service URL, the Service Broker sends a "Supplier Service Session Start" request to the chosen service's supplier application. The service context data is delivered to the supplier application via an HTTP Post to the URL (ServiceURL) specified by the supplier during registration. This is the initial communication between the broker application and the service application. In the RoundTrip embodiment, data is delivered as an XML format document within a hidden form field. The name of the hidden field typically is the name of the root element tag in the document being sent – for example, RTServiceStart, RTServiceEnd, RTServiceCancel, and RTServiceError. The general form for conveying the hidden field can use the following syntax:

```

<FORM ...
< hidden name="RTServiceStart" value ="<XML document ...
>"
5  >

```

In greater detail, the following schema depicts one embodiment of a supplier service session start document. Both the specific schema and some common schema information used in conjunction with the specific schema are provided.

```

10  <?xml version="1.0"?>
    <!DOCTYPE schema SYSTEM
    "urn:xcommerceone:document:com:commerceone:xdk:xml:schema.dtd$1.0">
    <schema uri="urn:x-
15  commerceone:document:com:commerceone:roundtrip:schemas:RoundTripServ
    iceStart.sox$1.0">
    <comment>
    Copyright 1999 Commerce One Inc.
    </comment>

20  <namespace prefix="cbl" namespace="urn:x-commerceone:document:com:
    commerceone:CBL:CBL.sox$1.0"/>

    <namespace prefix="common" namespace="urn:x-commerceone:document:
    com:commerceone:roundtrip:RoundTripCommonTypes.sox$1.0"/>

25  <elementtype name="RTServiceStart">
    <model>
        <sequence>
            <element prefix="common"
30  type="DocumentExchangeProtocolInformation"/>
            <element prefix="common" type="SessionInfo"/>
                <element type="LoginInfo"/>
                <element name="TimeOut" type="int" occurs="?" />
                <element prefix="cbl" name="Language" type="LangCode" occurs="?" />
35  <element prefix="cbl" name="Currency" type="CurrencyCode" occurs="?" />
                <element prefix="cbl" name="Country" type="CountryCode" occurs="?" />
                <element name="BuyerAppInfo" prefix="common" type="ApplicationInfo"
    occurs="?" />
                <element prefix="common" type="AcceptInfoType"/>
40  <element prefix="common" type="CancelInfoType"/>

```



```

        <element prefix="common" type="URLDataType" name="ErrorURL"
occurs="?" />
        <element prefix="common" type="PassThruData" occurs="?" />
        <element name="SupplierPartNum" type="LimitedString"
5 occurs="?" />
        <element name="SupplierID" type="LimitedString" occurs="?" />
        <element name="SupplierIDAgency" type="LimitedString"
occurs="?" />
        <element name="SupplierAssignedAccountNum"
10 type="LimitedString" occurs="?" />
        </sequence>
        </model>
        </elementtype>

15 <elementtype name="LoginInfo">
        <explain>
        <p>The <code>LoginInfo</code> contains the
        authentication data for signing onto the RoundTrip
        services.</p>
20 </explain>
        <model>
        <sequence>
        <element name="UserID" type="LimitedString" occurs="?" />
        <element name="Password" type="LimitedString" occurs="?" />
25 <element name="OrgID" type="LimitedString" />
        <element name="OrgIDAgency" type="LimitedString" occurs="?" />
        </sequence>
        </model>
        </elementtype>
30 </schema>

```

### **Common Types**

```

<?xml version="1.0"?>
35 <!DOCTYPE schema SYSTEM "urn:x-commerceone:document:com:
commerceone:xdk:xml:schema.dtd$1.0">
<schema uri="urn:x-commerceone:document:com:commerceone:
roundtrip:schemas:RoundTripCommonTypes.sox$1.0">
40 <comment> Copyright 1999 Commerce One Inc. </comment>

```

<comment> AccetplInfo and CancellInfo should use a common datatype which could be ActionInfo  
</comment>

```

5      <elementtype name="AcceptInfoType">
        <model>
          <sequence>
            <element type="NameDataType" name="Label"/>
            <element type="URLDataType" name="URL" />
10        </sequence>
        </model>
      </elementtype>

      <elementtype name="CancelInfoType">
15      <model>
        <sequence>
          <element type="NameDataType" name="Label"/>
          <element type="URLDataType" name="URL" />
        </sequence>
20      </model>
      </elementtype>

      <elementtype name="ScreenSize">
        <model>
25        <element name="HorizontalSize" type="int"/>
        <element name="VerticalSize" type="int"/>
        </model>
      </elementtype>

30      <elementtype name="SessionInfo">
        <model>
          <element type="SessionContext" type="string" occurs="?" />
        </model>
        <attdef name="SessionID" datatype="UUID">
35        <required/>
          <explain>
            <p>This is the service session id assigned by the broker.</p>
          </explain>
        </attdef>
40      </elementtype>

```

```

5      <elementtype name="PassThruData">
          <explain>
              <p>A place holder element for any other data that is
              required by the application to process the document(s) and
              other information returned in the BrokerSessionEnd.</p>
              <p><code>Content</code> - Format to be defined by the
              application. Note it cannot be in XML format (XML data can
              be URL encoded or otherwise encoded).</p>
          </explain>
10      <model>
          <element name="Blob" type="string"/>
          </model>
      </elementtype>

15      <elementtype name="DocumentExchangeProtocolInformation">
          <empty/>
          <attdef name="Protocol" datatype="LimitedString">
              <default>RoundTrip</default>
          </attdef>
20      <attdef name="ProtocolVersion" datatype="LimitedString">
          <default>1.0</default>
          </attdef>
      </elementtype>

25      <elementtype name="Name">
          <model>
              <element name="NameString" type="NameDataType"/>
          </model>
30      </elementtype>

          <datatype name="NameDataType">
              <varchar maxlength="50" datatype="string"/>
          </datatype>
35      <datatype name="LimitedString">
          <varchar maxlength="80" datatype="string"/>
          </datatype>

40      <elementtype name="ApplicationInfo">
          <model>

```

```

        <element name="AppFrameSize" type="ScreenSize" occurs="?" />
    </model>

    <attdef name="AppName" datatype="string">
5      <required/>
    </attdef>

    <attdef name="AppVersion" datatype="string">
      <required/>
10    </attdef>
    </elementtype>

    <datatype name="UUID">
      <varchar maxlength="64" datatype="string"/>
15    </datatype>

    <datatype name="URLDataType">
      <varchar maxlength="256" datatype="string" />
    </datatype>
20

    <datatype name="URNDataType">
      <varchar maxlength="256" datatype="string"/>
    </datatype>

25 </schema>

```

The following table explains some of the data items included in the supplier service session start XML document. In this table, the Supplier Service Session Start data is categorized. Session data is MarketSite Service Broker session information. Data such as session id is used by the broker application to associate the acquired data (order details) with a supplier service session. Other data, such as language, is provided as a courtesy so that the web-based service can provided a tailored experience. Authentication data includes information such as the organization's user-id and password. Authorization data, for catalogs and configurators, for instance, includes the buyer's supplier assigned account number or customer number. Parameter data provides information required by the supplier's service application. For example, a configurator will need a supplier part number. Parameter data typically can be provided by the buyer application. Finally, action data includes button labels and URLs for accept, cancel and other actions.

Variable	Category	Description
DocumentExchange ProtocolInformation	Session	Specifies the document exchange protocol and version used, e.g., "RoundTrip" and the version is 1.0.
SessionID	Session	This client session id (UUID) allows the Roundtrip broker to associate the incoming configuration data (via Accept URL) with the supplier service and the buyer that performed the action.
TimeOut	Session	Client session timeout value in minutes is optional.
Language	Session	The user preferred two-letter ISO language code. Reference CBL element LangCode.
Currency	Session	Reference CBL element CurrencyCode is optional.
Country	Session	Can be used to determine/guess the number and date formats. Reference CBL element CountryCode.
BuyerAppName	Session	Buyer application name/id.
BuyerAppVersion	Session	Buyer application version.
BuyerAppFrameSize	Session	Buyer application's frame size.
UserID	Authentication	Used for implicit login. This means that the userid is on a per buying organization registered service basis.
Password	Authentication	Used for implicit login. This means that the password is on a per buying organization registered service basis.
OrgID	Authentication	
OrgIDAgency	Authentication	
AcceptURL	Action	A URL to a MarketSite ASP/servlet/CGI for processing the configured order.
AcceptLabel	Action	This is the button label that the trading partner web-based services will associate with the Accept URL.
CancelURL	Action	A URL to a MarketSite ASP/servlet/CGI for handling the user canceling the configurator process.
CancelLabel	Action	This is the button label that the suppliers will associate with the Cancel URL.
ErrorURL	Action	A URL to a MarketSite servlet for displaying errors.
PassThruData	Parameter	This parameter is passed through by the service broker. This can be used by the buyer and supplier applications to exchange service specific data that are not accounted for in the protocol. This would enable such buyers and suppliers to integrate without having to wait

Variable	Category	Description
		for a protocol change.

The previous table shows a basic supplier service session start data layout. The following table shows a list of additional supplier specific data items that can be part of the RoundTrip Supplier Service Start document:

5

Variable	Category	Description
SupplierPartNum	Parameter	Used by web-based configurators.
SupplierID	Parameter	While not required if connecting directly to a supplier, probably useful if connecting an intermediate trading partner.
SupplierIDAgency	Parameter	Used to identify the agency that created any identifiers (e.g. Supplier ID and Supplier Account Number) in this information set.
SupplierAssignedAccount Num	Parameter	For the supplier-based services, this is the customer number assigned by the supplier to the buying organization. This facilitates contract pricing.

The following example provides a document consistent with the schema above.

```

10  <?xml version="1.0"?>
    <?soxtype urn:x-commerceone:document:com:commerceone:roundtrip:schemas:
RoundTripServiceStart.sox$1.0?>
    <RTServiceStart
      xmlns:common="urn:x-
commerceone:document:com:commerceone:roundtrip:schemas:
15  RoundTripCommonTypes.sox$1.0"
      xmlns:cbl="urn:x-commerceone:document:com:commerceone:
CBL:CBL.sox$1.0">
      <common:DocumentExchangeProtocolInformation Protocol="RoundTrip"
ProtocolVersion="1.0"/>
20  <common:SessionInfo SessionID="CF543873-D7B9-11D3-830B-
00609709DDA1"/>
      <LoginInfo>
      <UserID>123456</UserID>
      <Password>my password</Password>
25  <OrgID>buyer organization id</OrgID>
      <OrgIDAgency>MarketSite.net</OrgIDAgency>
      </LoginInfo>
      <TimeOut>10</TimeOut>
      <Language>en</Language>

```

```

    <Currency>USD</Currency>
    <Country>US</Country>
    <BuyerAppInfo AppName="BuySite" AppVersion="6.0">
      <common:AppFrameSize>
5        <common:ScreenSize>
          <common:HorizontalSize>600</common:HorizontalSize>
          <common:VerticalSize>800</common:VerticalSize>
        </common:ScreenSize>
      </common:AppFrameSize>
10    </BuyerAppInfo>
    <common:AcceptInfoType>
    <common:Label>Order</common:Label>
    <common:URL>http://www.marketsite.net/servlet/end</common:URL>
    </common:AcceptInfoType>
15    <common:CancelInfoType>
    <common:Label>Cancel</common:Label>
    <common:URL>http://www.marketsite.net/servlet/cancel</common:URL>
    </common:CancelInfoType>
    <ErrorURL>http://www.marketsite.net/servlet/errhandler</ErrorURL>
20    <SupplierAssignedAccountNum>4356</SupplierAssignedAccountNum>
  </RTServiceStart>

```

Figure 2 depicts the supplier service session and direct buyer to supplier interaction 250. The buyer and supplier communicate directly with each other, without need for broker involvement, monitoring or logging. In other embodiments, the broker can forward many or all of the messages between the buyer and supplier, thereby enabling the broker application to log all or some aspects of the interaction to facilitate error recovery.

When the buyer is done with the supplier site, he may select a Submit or Cancel button in the browser. These selections lead to generation of a Service Session End or Service Session Cancel XML document, respectively, which is to be sent to the buyer by the supplier via the broker, as a hidden form field, over HTTP/S Post. The supplier service posts to a URL (CallbackURL) specified in the Supplier Service Session Start data. The data in this the posted document include Supplier Service Session End data as an XML document within a hidden form field, consistent with the following schema. The supplier's document also includes an order response (e.g., a shopping cart) as a CBL format document within a hidden form field. A schema for and example of a shopping cart response follow. The Service Session End document is sent to a buyer provided Submit URL. Alternatively, a Service Session Cancel document is sent to a buyer provided Cancel URL. The buyer receives and processes these documents.

Any errors that occur during this interaction may be posted to a specified error URL. These errors can be automatically displayed within the buyer's browser.

The supplier service session end document is an HTTP form is posted to the broker callback URL when the Supplier Service Session Ends. This form contains the "Supplier Service Session End" XML document and a List of Order Details CBL documents in hidden fields. The following syntax is used:

```

10      <FORM ACTION="http://roundtrip.marketsite.net/servlet/end"
        METHOD="POST"
        NAME="CallBackDialog">
        <INPUT TYPE="HIDDEN" NAME="RTServiceEnd"
          VALUE="&lt;?xml version=&quot;1.0&quot;?&gt;
          ...
          this is an HTML encoded RTServiceEnd document
15      ">
    </FORM>

```

The following schema depicts a supplier service session end document.

```

20      <?xml version="1.0"?>
      <!DOCTYPE schema SYSTEM "urn:x-
      commerceone:document:com:commerceone:xdk:xml:schema.dtd$1.0">
      <schema uri="urn:x-
      commerceone:document:roundtrip:schemas:RoundTripServiceEnd.sox$1.0">
      <comment>
25      Copyright 1999 Commerce One Inc.
      </comment>

      <namespace prefix="cbl" namespace="urn:x-
      commerceone:document:com:commerceone:CBL:CBL.sox$1.0"/>
30

      <namespace prefix="common" namespace="urn:x-
      commerceone:document:com:commerceone:roundtrip:RoundTripCommonT
      ypes.sox$1.0"/>

35      <elementtype name="RTServiceEnd">
        <model>
          <sequence>
            <element prefix="common"
            type="DocumentExchangeProtocolInformation"/>
40            <element prefix="common" type="SessionInfo"/>

```



```

        <element prefix="cbl" name="Language" type="LangCode" occurs="?" />
        <element prefix="cbl" name="Currency" type="CurrencyCode"
occurs="?" />
        <element prefix="cbl" name="Country" type="CountryCode" occurs="?" />
5      <element type="ResponseData" />
        <element prefix="common" type="PassThruData" occurs="?" />
        <element name="RequestEcho" type="RTServiceStart" occurs="?" />
        </sequence>
      </model>
10    </elementtype>

```

```

<elementtype name="ResponseData">
  <empty/>
  <attdef name="ResponseDataType" datatype="LimitedString">
15    <required/>
  </attdef>
  <attdef name="ResponseDataFormat" datatype="LimitedString">
    <required/>
  </attdef>
20  <attdef name="ResponseDataFormatVersion" datatype="LimitedString">
    <required/>
  </attdef>
</elementtype>

```

```

25 <elementtype name="ShoppingCart">
  <explain>
    <p>A <code>ShoppingCart</code> is typically returned from a
    RoundTrip session with a supplier's catalog or configurator.
    The <code>ShoppingCart</code> will contain an <code>
30    OrderRequest</code>.</p>
    <p><code>OrderRequest</code> - an order request containing the
    items selected by and/or configured by the user from the supplier's
    web based catalog/configurator.</p>
  </explain>

```

```

35 <extends type="ResponseData">
  <append>
    <element name="CartID" type="LimitedString"/>
    <element prefix="cbl" type="OrderRequest"/>
40  </append>
</extends>

```

</elementtype>  
</schema>

In this schema, the ResponseData element enables polymorphism of the session end data document. The extension of ResponseData is self-describing. That is, the basic attributes of ResponseData, which may be extended and adapted in various embodiments, describe the extended data attributes. Data type and version attributes allow the buyer application to determine what data is associated with the message. An optional data format attribute permits further definition of the data associated with the message. This is an extension of XML. The same message, with variants, can be adapted to a variety of functions, such as conveying reference to or the values of shopping cart data, conveying product configuration data, conveying tax calculation data or conveying shipping or foreign freight forwarding data. Use of a polymorphic data schema decouples programming from the evolution of document types and applications. Use of namespaces supports coordination of document type names, development, deployment and maintenance of applications. Relative to a namespace, a schema identifier is provided with a message, which is resolvable in a context of a system identifier. In the sample schemas herein, the system identifier is explicit and part of the self-describing data. The system identifier may be universally unique, across the namespace of the Internet, or locally unique in some narrower domain. At some sacrifice of general adaptability, the system identifier may be implicit in the data tables or program code used by the buyer or supplier application or it may be implicit in the choice of a narrower domain than the Internet. Other Sox extensions of XML which are useful in practicing aspects of the present invention are support of typed data, a predefined set of intrinsic types, such as *string*, *int*, *URI*, and *date*, user defined types based on *enumerated*, *scalar*, and *varchar* type definitions, namespaces and versions for schemas, and an extensibility mechanism that facilitates the reuse and evolution of schemas and element types. Translation of Sox to Java data formats can leverage strong typing and data structures which are readily mapped into Java.

Polymorphism is not limited in this invention to responses from a supplier. Responses from a buyer to a supplier also can take advantage of this method and data structure. Alternatively, polymorphism can be used at the outset of a session, in a first message (not necessarily the actual first message) from the initiating party to the broker. Either the buyer or supplier can initiate a session through the broker and use polymorphism during the

initiating. For example, a buyer can initiate a status inquiry or a purchase order start using data structures equivalent to ResponseData, in place of PassThroughData. A supplier can initiate a session, reversing the roles of the schemas or messages offered as examples herein, and use polymorphism during the initiating. This may be useful to a supplier for purchase order responses, invoices or advance shipment notices. At the conclusion of a session initiated by a supplier, the buyer may respond with data regarding changed conditions. Alternate schedules or other delivery information can be provided. Alternate configurations can be provided if a selected configuration has become unavailable.

The following table explains some data items that are part of the Supplier Service Session End document:

Variable	Category	Description
DocumentExchangeProtocolInformation	Session	Specifies the document exchange protocol and version used, e.g., "RoundTrip" and the version is 1.0.
SessionID	Session	Same as the Session ID provided as part of the Session Start.
Language	Session	Useful if the result data contains a language specific text without a specified language code and the language text in the result data is different than "Language" specified in the RoundTrip context. The user preferred two-letter ISO language code.
Currency	Session	Useful if the result data contains a monetary amount without a specified currency code and the currency in the result data is different than "Currency" specified in the RoundTrip context.
Country	Session	Useful if the result data contains any country specific formatted data without a specified country code and the country specific formatted data in the result data is different than "Country" specified in the RoundTrip context. Reference CBL element CountryCode.
ResponseDataFormat	Response	The Session End data format
ResponseDataFormatVersion	Response	Version number of response data format, e.g., CBL 2.0.
ResponseData	Response	Polymorphic data element, supporting shopping cart and other

Variable	Category	Description
		functions.
ResponseDataType	Response	Specifies the type of Response Data.
PassThruData		Used by the buyer and supplier applications to exchange service specific data that are not accounted for in the protocol. This would enable such buyers and suppliers to integrate without having to wait for a protocol change.
RequestEcho	Parameter	Echo back of original request. Provided for sanity checking – if the broker wants to process the Service End document according to data in the Service Start Request, for example.

As an extension of ResponseData, the following schema supports a shopping cart.

```

5  <?xml version="1.0"?>
    <!DOCTYPE schema SYSTEM "urn:x-commerceone:document:com:
commerceone:xdk:xml:schema.dtd$1.0">

    <schema uri="urn:x-commerceone:document:com:
10 commerceone:CBL:CBL.sox$1.0">

        <intro>
            <h1>Order Request</h1>

15         <p>Copyright Notice</p>
            <p>Common Business Library 2.0<br/>
            Copyright 1999.Commerce One, Inc.</p>
            <p>Permission is granted to use, copy, modify and distribute the
            DTD's, schemas and modules in the Commerce One Common Business
20         Library Version 2.0 subject to the terms and conditions specified
            at <tt>http://www.marketsite.net/xml/cbl/copyright.html</tt></p>
        </intro>

        <elementtype name="OrderRequest">
25         <model>
            <sequence>
                <element type="OrderRequestHeader"/>
                <element type="ListOfOrderRequestDetail"/>
                <element type="OrderRequestSummary"/>
30         </sequence>
        </model>

```

```

    </elementtype>

</schema>

5  <?xml version="1.0"?>
    <!DOCTYPE schema SYSTEM "urn:x-commerceone:document:com:
commerceone:xdk:xml:schema.dtd$1.0">

    <schema uri="urn:x-commerceone:document:com:
10 commerceone:CBL:CBL.sox$1.0">

        <intro>
            <h1>Order Request Detail</h1>

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            Copyright 1999 Commerce One, Inc.</p>
            <p>Permission is granted to use, copy, modify and distribute the
            DTD's, schemas and modules in the Commerce One Common Business
20         Library Version 2.0 subject to the terms and conditions specified
            at <tt>http://www.marketsite.net/xml/cbl/copyright.html</tt></p>
        </intro>

        <elementtype name="OrderRequestDetail">
25         <model>
            <extends type="BaseItemDetail">
                <append>
                    <sequence>
                        <element type="SupplierConfigNum" occurs="?" />
30         <element type="string" name="GeneralNote" occurs="?" />
                        <element type="Tax" occurs="?" />
                        <element type="ListOfAllowOrCharge" occurs="?" />
                        <element type="Price" name="BuyerExpectedUnitPrice" />
                        <element type="ListOfAttachment" name="OrderDetailAttachment"
35         occurs="?" />
                        <element type="boolean" name="Immutable" occurs="?" />
                    </sequence>
                </append>
            </extends>
40         </model>
        </elementtype>

        <elementtype name="ListOfOrderRequestDetail">
            <model>
45         <element type="OrderRequestDetail" occurs="+" />
            </model>
        </elementtype>

    </schema>

```

<?xml version="1.0"?>

<!DOCTYPE schema SYSTEM "urn:x-commerceone:document.com:  
commerceone:xdk:xml:schema.dtd\$1.0">

<schema uri="urn:x-commerceone:document.com:  
commerceone:CBL:CBL.sox\$1.0">

<intro>

<h1>Order Request Header</h1>

<p>Copyright Notice</p>

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DTD's, schemas and modules in the Commerce One Common Business  
Library Version 2.0 subject to the terms and conditions specified  
at <tt><http://www.marketsite.net/xml/cbl/copyright.html></tt></p>

</intro>

<elementtype name="OrderRequestHeader">

<model>

<sequence>

<element type="datetime" name="OrderRequestDate"/>

<element type="OrderRequestReference"/>

<element type="OrderParty" occurs="?">

<element type="Tax" occurs="?">

<element type="CurrencyCode" name="OrderCurrency"/>

<element type="LangCode" name="OrderLanguage"/>

<element type="string" name="GeneralNote" occurs="?">

<element type="boolean" name="Immutable" occurs="?">

<element type="ListOfAttachment"

name="OrderRequestHeaderAttachment" occurs="?">

</sequence>

</model>

</elementtype>

</schema>

<?xml version="1.0"?>

<!DOCTYPE schema SYSTEM "urn:x-commerceone:document.com:  
commerceone:xdk:xml:schema.dtd\$1.0">

<schema uri="urn:x-commerceone:document.com:  
commerceone:CBL:CBL.sox\$1.0">

<intro>

<h1>Order Request Reference</h1>

```

    <p>Copyright Notice</p>
    <p>Common Business Library 2.0<br/>
    Copyright 1999 Commerce One, Inc.</p>
5    <p>Permission is granted to use, copy, modify and distribute the
    DTD's, schemas and modules in the Commerce One Common Business
    Library Version 2.0 subject to the terms and conditions specified
    at <tt>http://www.marketsite.net/xml/cbl/copyright.html</tt></p>

10    <p>A collection of references that are used by
    <code>OrderRequest</code>.
    </intro>

    <elementtype name="OrderRequestReference">
15        <explain>
            <p><code>AccountCode</code> is the agreement number between a
            buyer and a supplier. An account may contain several contracts
            in it.</p>
            <p><code>CustRefNum</code> is the Order Request identification
20            number.</p>
            <p><code>BuyerRefNum</code> is Buyer's Purchase Order Num.</p>
            <p><code>SupplierRefNum</code> is Supplier's Order Num.</code>
            or Suppliers Sales Order Num.</p>
            <p><code>SupplierConfigNum</code> is a configuration number. </p>
25            <p><code>ListOfReferenceCoded</code> - This is used for other
            references that a buyer want to provide to supplier, such as
            Buyer Catalog Reference Number,</p>
        </explain>
        <model>
30            <sequence>
                <element type="Reference" name="AccountCode" occurs="?" />
                <element type="Reference" name="CustRefNum" occurs="?" />
                <element type="Reference" name="BuyerRefNum" occurs="?" />
                <element type="Reference" name="SupplierRefNum" occurs="?" />
35                <element type="Reference" name="SupplierConfigNum" occurs="?" />
                <element type="ListOfReferenceCoded" occurs="?" />
            </sequence>
        </model>
    </elementtype>
40 </schema>

    <?xml version="1.0"?>
    <!DOCTYPE schema SYSTEM "urn:x-commerceone:document:com:
45 commerceone:xdk:xml:schema.dtd$1.0">

    <schema uri="urn:x-commerceone:document:com:
    commerceone:CBL:CBL.sox$1.0">

```

<intro>

<h1>Order Request Summary</h1>

<p>Copyright Notice</p>

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Copyright 1999 Commerce One, Inc.</p>

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DTD's, schemas and modules in the Commerce One Common Business  
Library Version 2.0 subject to the terms and conditions specified

10 at <tt>http://www.marketsite.net/xml/cbl/copyright.html</tt></p>

</intro>

<elementtype name="OrderRequestSummary">

<model>

15 <sequence>

<element type="Decimal18\_3" name="TotalAmount"/>

<element type="int" name="TotalLineNum" occurs="?"/>

</sequence>

</model>

20 </elementtype>

</schema>

25 An example of an end document extended by a shopping cart morphism  
follows:

<?xml version="1.0"?>

<?soxtype urn:x-

30 commerceone:document:com:commerceone:roundtrip:schemas:RoundTripServiceEnd.sox\$1.0?>

<RTServiceEnd

xmlns:common="urn:x-

commerceone:document:com:commerceone:roundtrip:schemas:RoundTripCommonTypes.sox\$1.0"

35 xmlns:cbl="urn:x-

commerceone:document:com:commerceone:CBL:CBL.sox\$1.0">

<common:DocumentExchangeProtocolInformation Protocol="RoundTrip"  
ProtocolVersion="1.0"/>

<common:SessionInfo SessionID="CF543873-D7B9-11D3-830B-  
40 00609709DDA1"/>

<Language>en</Language>

<Currency>USD</Currency>

<Country>US</Country>

<ShoppingCart ResponseDataFormat="CBL"

45 ResponseDataFormatVersion="2.0" ResponseDataType="OrderRequest">

<CartID>3456</CartID>

<OrderRequest xmlns="urn:x-commerceone:document:com:commerceone:  
CBL:CBL.sox\$1.0">

<OrderRequestHeader>



```

5      <OrderRequestDate>19990531T19:55:00</OrderRequestDate>
      <OrderRequestReference>
      <AccountCode><Reference><RefNum>CTOP</RefNum></Reference>
      </AccountCode>
      <BuyerRefNum><Reference><RefNum>100</RefNum></Reference>
      </BuyerRefNum>
      <SupplierRefNum><Reference><RefNum>2</RefNum></Reference>
      </SupplierRefNum>
10     </OrderRequestReference>
      <OrderParty>
      <BuyerParty><Party>
      <NameAddress>
      <Name1>Mr. Muljadi Sulistio</Name1>
15     <Name2>Attention:Business Service Division</Name2>
      <Address1>1600 Riviera Ave.</Address1>
      <Address2>Suite #200</Address2>
      <City>Walnut Creek</City>
      <State>CA</State>
20     <PostalCode>94596</PostalCode>
      <Country>US</Country>
      </NameAddress>
      <OrderContact>
      <Contact>
25     <ContactName>Mr. Muljadi Sulistio</ContactName>
      <Telephone>(650) 932-4555</Telephone>
      <Email>mike.holloway@commerceone.com</Email>
      <Fax>(650) 468-8900</Fax>
      </Contact>
30     </OrderContact>
      <ReceivingContact>
      <Contact>
      <ContactName>Mr. Debbie Dub</ContactName>
      <Telephone>(650) 932-4555</Telephone>
35     <Email>debbie.dub@commerceone.com</Email>
      <Fax>(650) 468-8900</Fax>
      </Contact>
      </ReceivingContact>
      <ShippingContact>
40     <Contact>
      <ContactName>Mr. John Wayne</ContactName>
      <Telephone>(650) 932-4555</Telephone>
      <Email>john.wayne@commerceone.com</Email>
      <Fax>(650) 468-8900</Fax>
45     </Contact>
      </ShippingContact>
      </Party></BuyerParty>
      <SupplierParty><Party>
      <NameAddress>

```

```

5      <Name1>Millenium Supplier</Name1>
      <Name2>Attention: Office Supply Division</Name2>
      <Address1>1600 Riviera Ave.</Address1>
      <Address2>Suite #200</Address2>
      <City>Walnut Creek</City>
      <State>CA</State>
      <PostalCode>94596</PostalCode>
      <Country>US</Country>
      </NameAddress>
10     </Party></SupplierParty>
      </OrderParty>
      <OrderCurrency>USD</OrderCurrency>
      <OrderLanguage>EN</OrderLanguage>
      </OrderRequestHeader>
15     <ListOfOrderRequestDetail>
      <OrderRequestDetail>
      <LineItemNum>1</LineItemNum>
      <SupplierPartNum>
      <PartNum>
20     <Agency>AssignedBySupplier</Agency>
      <PartID>12345</PartID>
      </PartNum>
      </SupplierPartNum>
      <ItemDescription>Sanford Highlighting
25   Marker</ItemDescription>
      <Quantity>
      <Qty>000000000001.000</Qty>
      <UnitOfMeasure>EA</UnitOfMeasure>
      </Quantity>
30     <Transport Direction="SupplierToBuyer">
      <Mode>Air</Mode>
      <Mean>Express</Mean>
      <Carrier>Fedex</Carrier>
      <CustShippingContractNum>CTOP123</CustShippingContractNum>
35     <ShippingInstruction>Please handle with care
      </ShippingInstruction>
      </Transport>
      <OffCatalogFlag>>false</OffCatalogFlag>
      <BuyerExpectedUnitPrice>
40     <Price><UnitPrice>00000000010.0000</UnitPrice></Price>
      </BuyerExpectedUnitPrice>
      </OrderRequestDetail>
      </ListOfOrderRequestDetail>
      <OrderRequestSummary>
45     <TotalAmount>00000000001000.000</TotalAmount>
      <TotalLineNum>1</TotalLineNum>
      </OrderRequestSummary>
      </OrderRequest>
      </ShoppingCart>

```

</RTServiceEnd>

Figure 6 depicts a sequence ending the broker session, upon completion of the supplier service session. Once the buyer 230A is done, an order or cancel button is selected at the buyer browser. This generates an HTTP/S Post of a service session end document to the broker application. The broker sends it through the L1 component 413 to a forwarding component of the L2 component 416. The forwarding component processes the data, receives a service session end document from the supplier application, forwards the document to the buyer's procurement application 230B, receives a reply, and forwards the reply to the buyer for display in the buyer's browser or other viewing software 230A. In the context of the present invention, the buyer application can refer to the buyer's browser, the procurement application or both. When the service interaction completes and the supplier sends a "Supplier Service Session End" request to the broker, the broker processes the "Supplier Service Session End" message and generates an HTTP post to the buyer callback URL that was specified by the buyer during registration. The data in this communication contains the supplier service session end data as an XML document within a hidden form field. As described above, in the instance of a shopping cart session, the order details (shopping cart) as a CBL format document within a hidden form field.

An example of one embodiment practicing aspects of the present invention begins when a user web browser is displaying ABC Motors Product Search page in which one or more motors have been selected. The user reads and selects one or more items. The user clicks on an "Order Form" link to submit the request. The ABC Motors order form page is served up by the ABC Motors server. The "Check Out" button sometimes used in e-commerce is replaced with the buyer application specified "Accept" button label. For example, the actual label may read "Add To a Requisition." The user clicks on the "Accept" button. This results in a HTTP/S Post to the ABC Motors server. The web browser is waiting for an HTTP Reply. The ABC Motors server HTTP/S Posts to the broker application the OrderRequest and context earlier provided by the broker application. The ABC Motors server is waiting for an HTTP Reply. The broker application HTTP/S Posts to the appropriate buyer application "Accept Order Request" ASP page for receiving the OrderRequest CBL and earlier provided buyer application context. The broker application is waiting for an HTTP Reply. The buyer application "Accept Order Request" ASP adds the items in the OrderRequest to the user's requisition (the buyer application context contains the user session information) and then HTTP/S Replies with HTML (to the broker application). The broker

application HTTP/S Replies with the buyer application provided HTML to the ABC Motors server. The ABC Motors server HTTP/S Replies with the buyer application provided HTML to the user's web browser. The user's web browser refreshes per the HTML.

Due to the polymorphic nature of the message used to conclude the buyer-supplier session, the message is suitable for a variety of divers applications, including product configuration, tax calculations or freight forward, in addition to this shopping cart example. A further example of a tax calculation extension to ResponseData follows:

```

10      <elementtype name="TaxCalculation">
          <explain>
              <p>A <code>Tax</code> is typically returned from a
              RoundTrip session with a supplier's catalog or configurator.
              The <code>ShoppingCart</code> will containan <code>
              OrderRequest</code>.</p>
              <p><code>OrderRequest</code> - an order request containing the
15              items selected by and/or configured by the user from the supplier's
              web based catalog/configurator.</p>
          </explain>

          <extends type="ResponseData">
20              <append>
                  <element prefix="cbl" type="Tax"/>
              </append>
          </extends>
      </elementtype>
25 </schema>

```

Additional aspects of a system practicing the present invention may include forwarding a purchase order, as depicted in figure 2. Cancellation and error messages, referred to above, are described by schemas following the general form of the schemas presented in the examples.

It is inherent in the present invention that methods practicing the present invention can be expressed as articles of manufacture by describing the method as embodied in a program stored on a magnetic medium. It is further inherent that those methods can be expressed as a broker server device running the broker portion of the method or as a system including buyer, broker and supplier servers running their respective portions of the method.

While the present invention is disclosed by reference to the embodiments and examples detailed above, it is understood that these examples are intended in an illustrative rather than in a limiting sense. It is contemplated that modifications and combinations will readily occur to those skilled in the art, which modifications and combinations will be within the spirit of

the invention and the scope of the following claims. Each method practicing the present invention may readily be recast as a device or article of manufacture.

## Claims

What is claimed is:

- 5           1. A protocol for conveying data during an e-commerce session with a polymorphic response, comprising:
- initiating a session with a first message from a buyer application to a broker application and a second message from the broker application to a supplier application;
- 10                   conducting the session between the buyer application and the supplier application; and
- responding during the session with an additional message including:
- a schema identifier for the additional message, resolvable in a context of a system identifier; and
- a polymorphic response comprising a type and a version, wherein the polymorphic response including additional data elements corresponding to values assigned to the type and version.
- 20           2. The protocol of claim 1, wherein the system identifier is explicit in the additional message.
- 25           3. The protocol of claim 1, wherein the system identifier for the additional message is implicit.
- 30           4. The protocol of claim 1, wherein the buyer application comprises a browser.

5. The protocol of claim 1, wherein the buyer application comprises a procurement application.
- 5 6. The protocol of claim 1, wherein the buyer application comprises a browser and a procurement application.
7. The protocol of claim 1, wherein the second message forwards at least a portion of the first message.
- 10 8. The protocol of claim 1, wherein conducting the session between the buyer application and the supplier application includes direct communications between the respective applications.
- 15 9. The protocol of claim 1, wherein conducting the session between the buyer application and the supplier application includes communications between the respective applications through the broker application.
10. The protocol of claim 1, wherein the polymorphic response is represented in an extension of XML.
- 20 11. The protocol of claim 1, wherein the polymorphic response is represented in a form compatible with Sox.
12. The protocol of claim 1, wherein the additional message is sent by the supplier application to the broker application.
- 25 13. The protocol of claim 12, wherein the additional message is forwarded by the broker application to the buyer application.
- 30 14. The protocol of claim 12, further including the broker application translating a supplier's format of the additional data elements to a buyer's format of the additional data elements.

15. The protocol of claim 13, further including the broker application translating a supplier's format of the additional data elements to a buyer's format of the additional data elements.

5 16. The protocol of claim 12, wherein the additional message includes price and destination information and the broker application calculates tax applicable to the price and destination information.

10 17. The protocol of claim 13, wherein the additional message includes price and destination information and the broker application calculates tax applicable to the price and destination information.

18. The protocol of claim 1, wherein the system identifier comprises a universal resource name.

15 19. The protocol of claim 1, wherein the additional data elements of the polymorphic response are adapted to transmitting a shopping basket identifier from the supplier to the buyer.

20 20. The protocol of claim 12, wherein the additional data elements of the polymorphic response are adapted to transmitting a shopping basket identifier from the supplier to the buyer.

25 21. The protocol of claim 1, wherein the additional data elements of the polymorphic response are adapted to transmitting a shopping basket data set from the supplier to the buyer.

30 22. The protocol of claim 12, wherein the additional data elements of the polymorphic response are adapted to transmitting a shopping basket data set from the supplier to the buyer.



23. The protocol of claim 1, wherein the additional data elements of the polymorphic response are adapted to transmitting product configuration data.
- 5 24. The protocol of claim 12, wherein the additional data elements of the polymorphic response are adapted to transmitting product configuration data.
25. The protocol of claim 1, wherein the additional data elements of the polymorphic response are adapted to transmitting tax calculation data.
- 10 26. The protocol of claim 12, wherein the additional data elements of the polymorphic response are adapted to transmitting tax calculation data.
27. The protocol of claim 1, wherein the additional data elements of the polymorphic response are adapted to transmitting freight forwarding data.
- 15 28. The protocol of claim 12, wherein the additional data elements of the polymorphic response are adapted to transmitting freight forwarding data.
29. A protocol for conveying data during an e-commerce session with a polymorphic response, comprising:
- 20 initiating a session with a first message from a supplier application to a broker application and a second message from the broker application to a buyer application;
- 25 conducting the session between the buyer application and the supplier application; and
- responding during the session with an additional message including:
- 30 a schema identifier for the additional message, resolvable in a context of a system identifier; and

a polymorphic response comprising a type and a version, wherein the polymorphic response including additional data elements corresponding to values assigned to the type and version.

- 5           30. The protocol of claim 29, wherein the system identifier is explicit in the additional message.
31. The protocol of claim 29, wherein the system identifier for the additional message is implicit.
- 10          32. The protocol of claim 29, wherein the buyer application comprises a browser.
33. The protocol of claim 29, wherein the buyer application comprises a procurement application.
- 15          34. The protocol of claim 29, wherein the buyer application comprises a browser and a procurement application.
35. The protocol of claim 29, wherein the second message forwards at least a portion
- 20           of the first message.
36. The protocol of claim 29, wherein conducting the session between the buyer application and the supplier application includes direct communications between the respective applications.
- 25          37. The protocol of claim 29, wherein conducting the session between the buyer application and the supplier application includes communications between the respective applications through the broker application.
- 30          38. The protocol of claim 29, wherein the polymorphic response is represented an extension of XML.

39. The protocol of claim 29, wherein the polymorphic response is compatible with Sox.
40. The protocol of claim 29, wherein the additional message is sent by the supplier application to the broker application.
41. The protocol of claim 40, wherein the additional message is forwarded by the broker application to the buyer application.
42. The protocol of claim 40, further including the broker application translating a supplier's format of the additional data elements to a buyer's format of the additional data elements.
43. The protocol of claim 41, further including the broker application translating a supplier's format of the additional data elements to a buyer's format of the additional data elements.
44. The protocol of claim 40, wherein the additional message includes price and destination information and the broker application calculates tax applicable to the price and destination information.
45. The protocol of claim 41, wherein the additional message includes price and destination information and the broker application calculates tax applicable to the price and destination information.
46. The protocol of claim 29, wherein the system identifier comprises a universal resource name.
47. A protocol for conveying data during an e-commerce session with a polymorphic message, comprising:
- initiating a session with a first message from a buyer application to a broker application including:

a schema identifier for the first message, resolvable in a context of a system identifier; and

5 a polymorphic message comprising a type and a version, wherein the polymorphic message including additional data elements corresponding to values assigned to the type and version;

10 sending a second message from the broker application to a supplier application; and

conducting the session between the buyer application and the supplier application.

15 48. The protocol of claim 47, wherein the system identifier is explicit in the additional message.

49. The protocol of claim 47, wherein the system identifier for the additional message is implicit.

20 50. The protocol of claim 47, wherein the buyer application comprises a browser.

51. The protocol of claim 47, wherein the buyer application comprises a procurement application.

25 52. The protocol of claim 47, wherein the buyer application comprises a browser and a procurement application.

30 53. The protocol of claim 47, wherein the second message forwards at least a portion of the first message.

54. The protocol of claim 47, wherein conducting the session between the buyer application and the supplier application includes direct communications between

the respective applications.

- 5 55. The protocol of claim 47, wherein conducting the session between the buyer application and the supplier application includes communications between the respective applications through the broker application.
56. The protocol of claim 47, wherein the polymorphic response is represented in an extension of XML.
- 10 57. The protocol of claim 47, wherein the polymorphic response is represented in a form compatible with Sox.
58. The protocol of claim 47, further including the broker application translating a buyer's format of the additional data elements to a supplier's format of the additional data elements.
- 15 59. The protocol of claim 47, wherein the system identifier comprises a universal resource name.
- 20 60. The protocol of claim 47, wherein the additional data elements of the polymorphic message are adapted to transmitting status inquiry data.
61. The protocol of claim 53, wherein the additional data elements of the polymorphic message are adapted to transmitting status inquiry data.
- 25 62. The protocol of claim 47, wherein the additional data elements of the polymorphic message are adapted to transmitting purchase order data.
63. The protocol of claim 53, wherein the additional data elements of the polymorphic message are adapted to transmitting purchase order data.
- 30

64. A protocol for conveying data during an e-commerce session with a polymorphic message, comprising:

initiating a session with a first message from a supplier application to a broker application including:

a schema identifier for the first message, resolvable in a context of a system identifier; and

a polymorphic message comprising a type and a version, wherein the polymorphic message including additional data elements corresponding to values assigned to the type and version;

sending a second message from the broker application to a buyer application; and

conducting the session between the buyer application and the supplier application.

65. The protocol of claim 64, wherein the system identifier is explicit in the additional message.

66. The protocol of claim 64, wherein the system identifier for the additional message is implicit.

67. The protocol of claim 64, wherein the buyer application comprises a browser.

68. The protocol of claim 64, wherein the buyer application comprises a procurement application.

69. The protocol of claim 64, wherein the buyer application comprises a browser and a procurement application.

70. The protocol of claim 64, wherein the second message forwards at least a portion of the first message.
- 5 71. The protocol of claim 64, wherein conducting the session between the buyer application and the supplier application includes direct communications between the respective applications.
- 10 72. The protocol of claim 64, wherein conducting the session between the buyer application and the supplier application includes communications between the respective applications through the broker application.
73. The protocol of claim 64, wherein the polymorphic response is represented in an extension of XML.
- 15 74. The protocol of claim 64, wherein the polymorphic response is represented in a form compatible with Sox.
- 20 75. The protocol of claim 64, further including the broker application translating a supplier's format of the additional data elements to a buyer's format of the additional data elements.
- 25 76. The protocol of claim 70, further including the broker application translating a supplier's format of the additional data elements to a buyer's format of the additional data elements.
77. The protocol of claim 64, wherein the system identifier comprises a universal resource name.
- 30 78. The protocol of claim 64, wherein the additional data elements of the polymorphic message are adapted to transmitting a purchase order response.

79. The protocol of claim 70, wherein the additional data elements of the polymorphic message are adapted to transmitting a purchase order response.

5 80. The protocol of claim 64, wherein the additional data elements of the polymorphic message are adapted to transmitting an invoice.

81. The protocol of claim 70, wherein the additional data elements of the polymorphic message are adapted to transmitting an invoice.

10 82. The protocol of claim 64, wherein the additional data elements of the polymorphic message are adapted to transmitting an advance shipping notification.

83. The protocol of claim 70, wherein the additional data elements of the polymorphic message are adapted to transmitting an advance shipping notification.

15



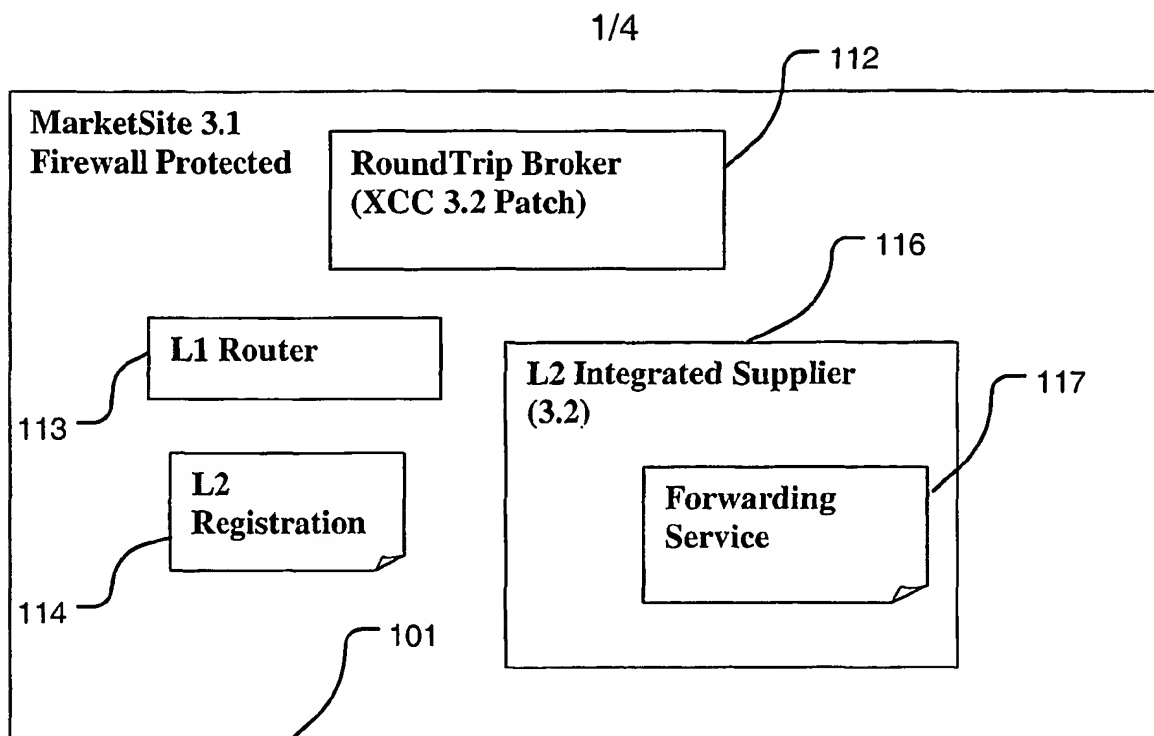


Fig. 1

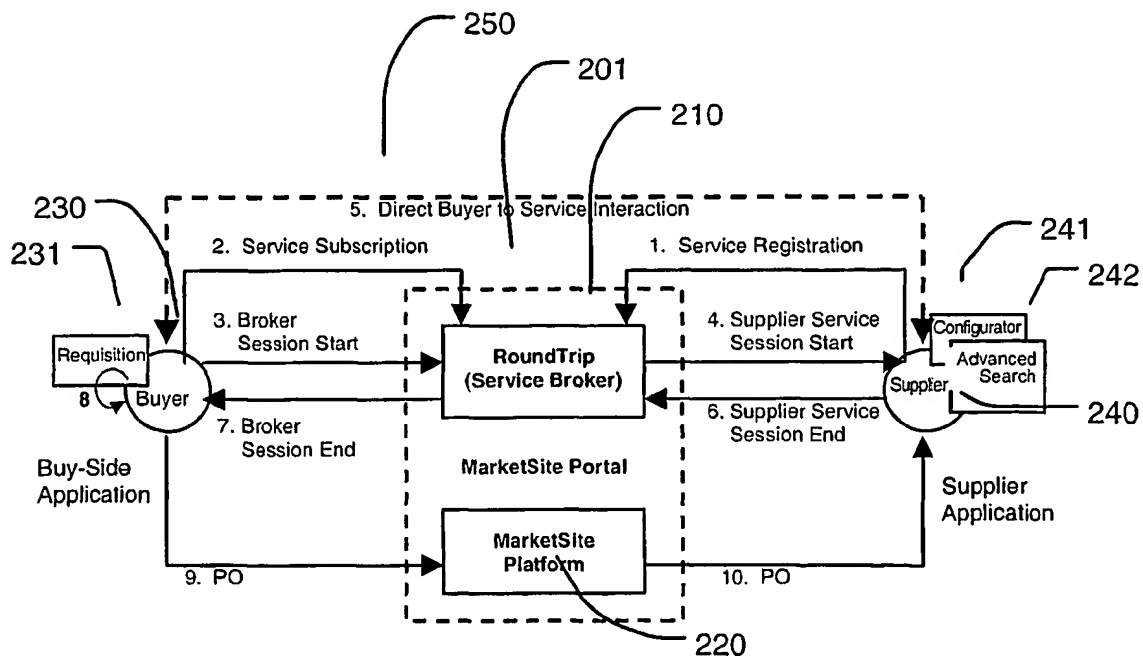


Fig. 2

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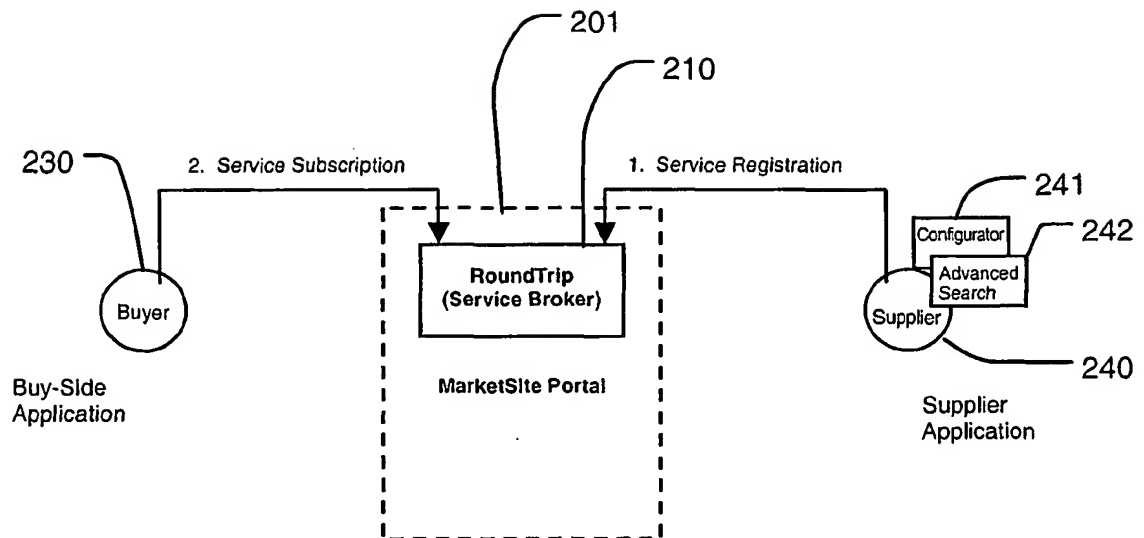


Fig. 3

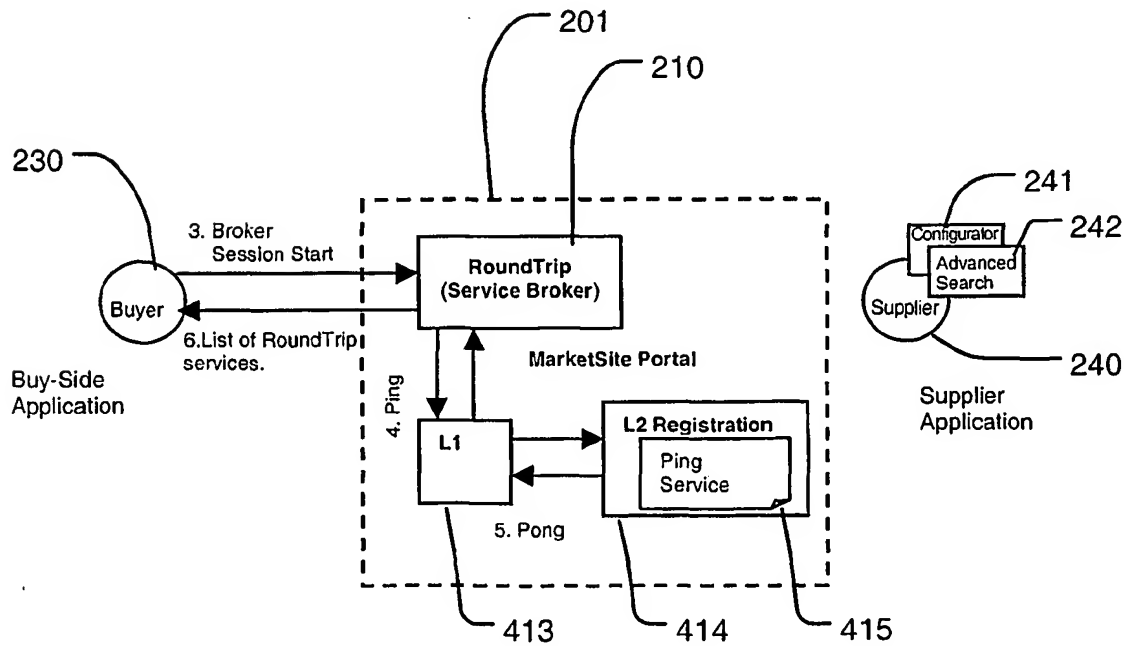


Fig. 4

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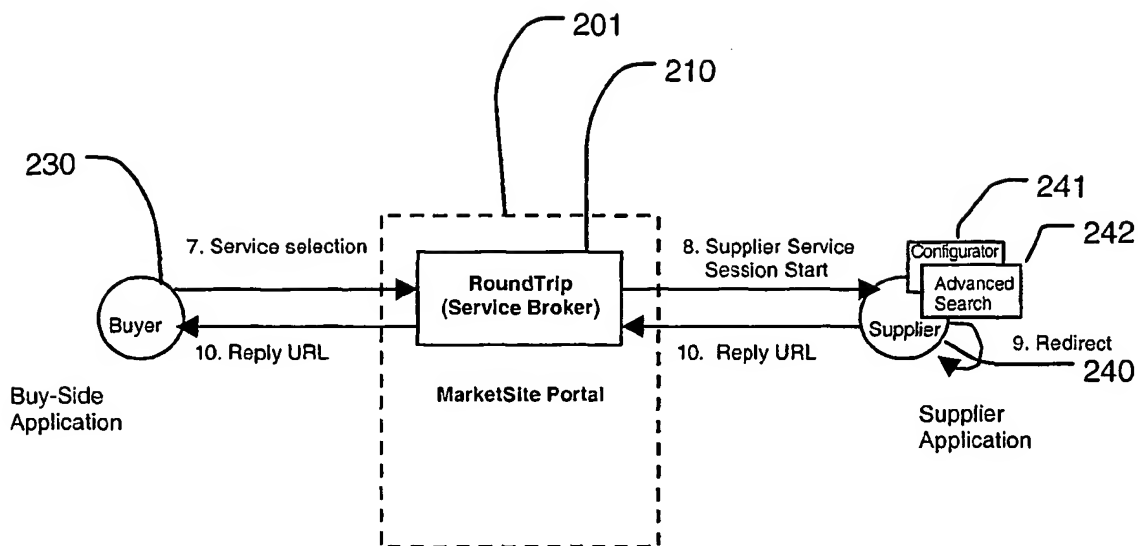


Fig. 5

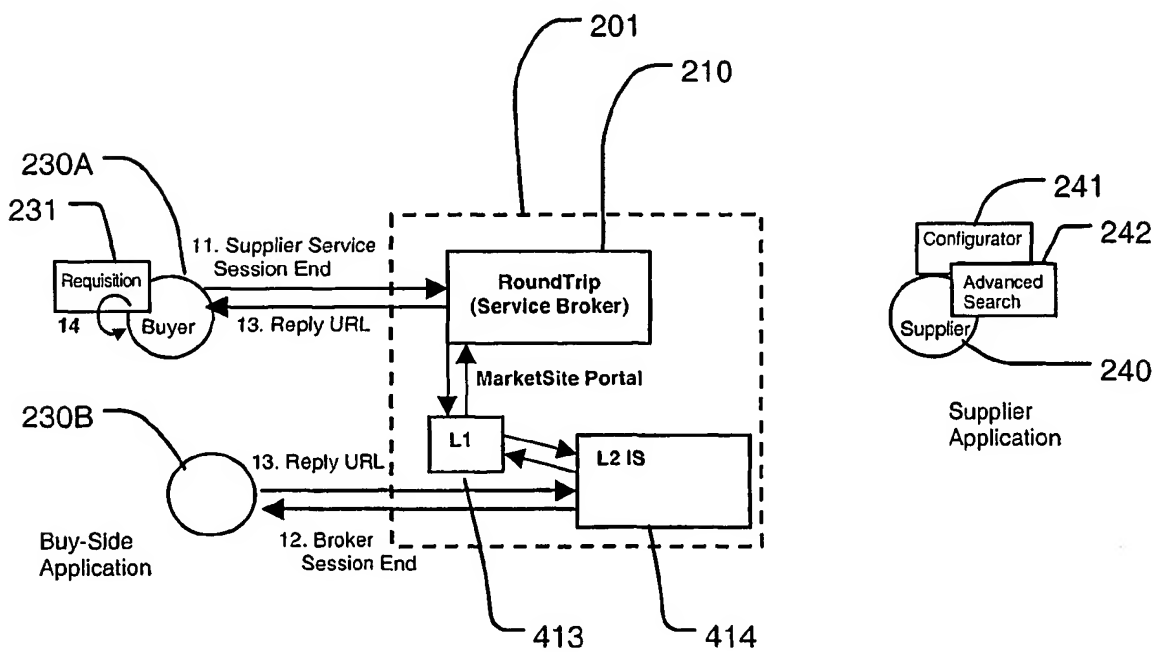


Fig. 6

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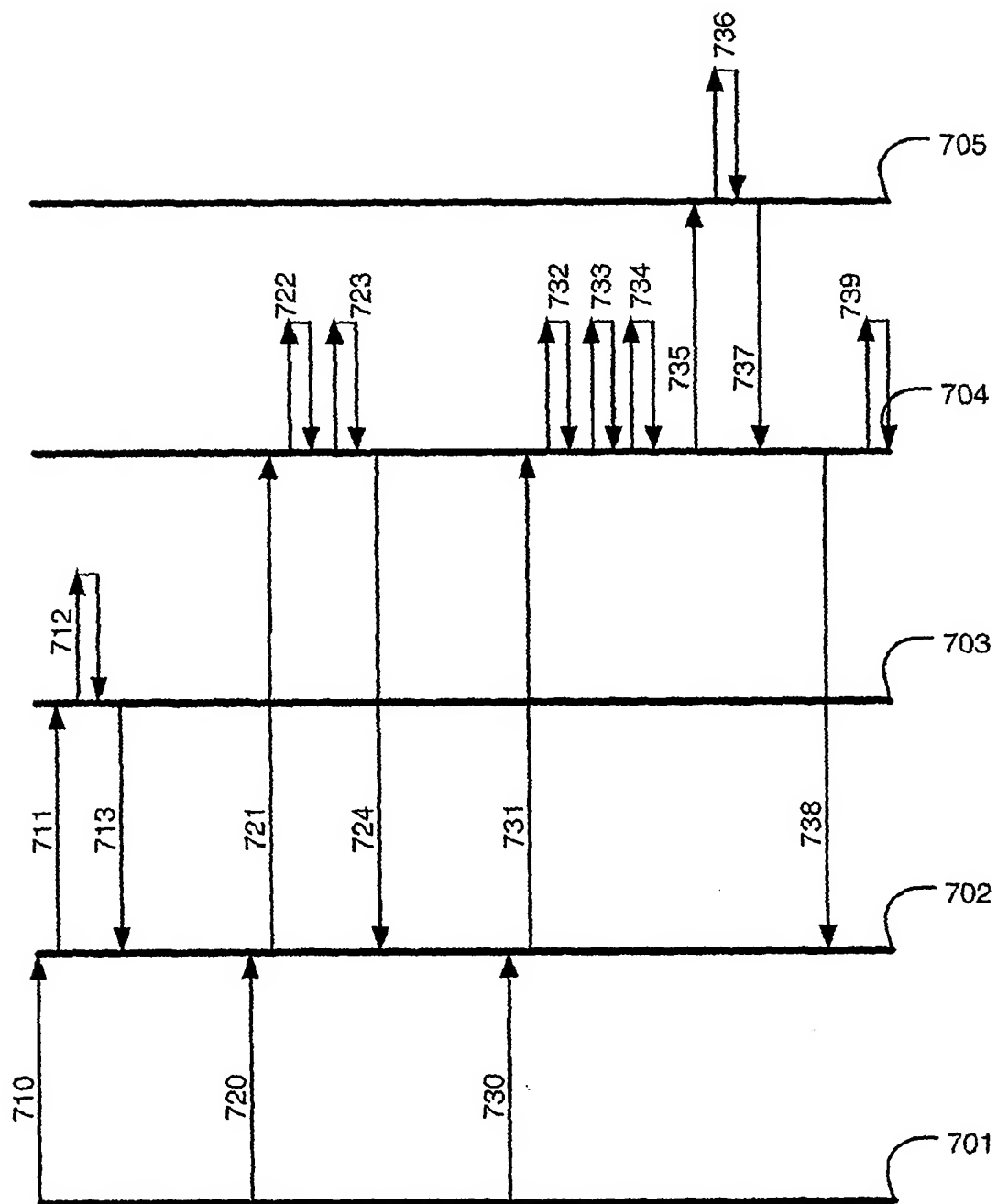


Fig. 7

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/US01/47250

## A. CLASSIFICATION OF SUBJECT MATTER.

IPC(7) : G06F 17/60

US CL : 705/21

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 705/21

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6,125,391 A (MELTZER et al) 26 SEPTEMBER 2000, col.2, line 1-col.10, line 27	1-83
A. E	US 6,341,353 B1 (HERMAN et al) 22 JANUARY 2002(22.01.2002), see abstract	1, 29, 47, and 64

☐ Further documents are listed in the continuation of Box C.☐ See patent family annex.

\* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent published on or after the international filing date

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"U" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T"

later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X"

document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y"

document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&amp;"

document member of the same patent family

Date of the actual completion of the international search

09 March 2002 (09.03.2002)

Date of mailing of the international search report

09 APR 2002

Name and mailing address of the ISA/US

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